

AEROSPACE

A journey through the history of flight



BOOKS FOR KIDS BY KIDS

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A JOURNEY THROUGH THE HISTORY OF FLIGHT

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INTRODUCTION

Although the characters in this story are fictional, the location in which the story takes place is real. The Steven F. Udvar-Hazy Center, which is a branch of the Smithsonian National Air and Space Museum, is located in Chantilly, Virginia.

The Center offers a variety of displays, activities, and features that make it an attractive location for a field trip or outing.

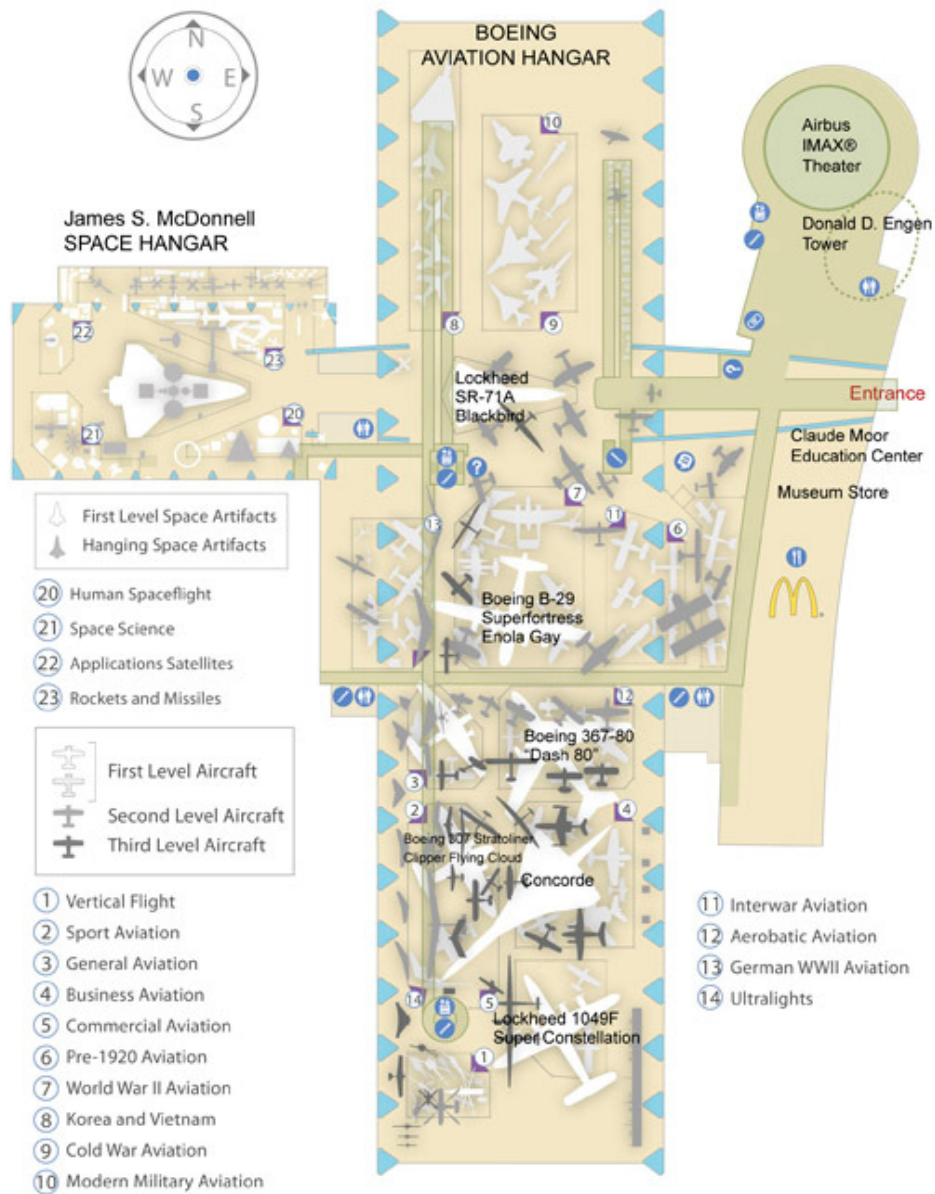
The Center features...

- Flight Simulators (both for space flight and traditional planes)
- Gift Shop
- Eatery
- Display Aircraft for children to sit in and learn about the controls
- Guided tours
- IMAX Theater

Entry into the museum is free, however there are separate fees for some activities (flight simulators, IMAX, etc.)

We hope you enjoy the book and if you get the chance to visit the Steven F. Udvar-Hazy Center, we hope you enjoy your visit as well insha-Allah.

MAP OF THE NATIONAL AIR AND SPACE MUSEUM STEVEN F. UDVAR-HAZY CENTER





**SMITHSONIAN NATIONAL AIR AND SPACE MUSEUM
STEVEN F. UDVAR-HAZY CENTER**

Omar searched through the woman's purse and found nothing but keys, a wallet, and some papers. He looked up and smiled at her, then said, "Your okay, have a nice visit, but remember, the museum is closing in an hour."

Just then Hasan, Omar's friend, walked in through the main entrance and hooked his badge to his uniform pocket.

Omar said, "You're late! I can't screen the museum visitors AND watch all the surveillance cameras by myself. If you are late again, the manager will report you and you might lose your job!"

"I know," replied Hasan in a serious voice. "I took the train from Washington DC, but it was delayed because there was an accident on the other line that had to be cleared. It won't happen again insha-Allah," Hasan explained.

They sat behind the security counter as they waited for closing time to come. Omar and Hasan were the nighttime security guards at the Steven F. Udvar-Hazy Center, in Chantilly, Virginia. This center was an extension of the Smithsonian National Air and Space Museum in Washington, D.C. It had been opened in two unused hangers. The hangers had been renovated specifically for the purpose of displaying the many important objects in the Smithsonian collection that had been in storage for years.

The hour until closing time passed quickly, and soon they found themselves locking all the doors and checking the IMAX seats to make sure all the visitors had left.

Omar used his flashlight to look in all the corners and along all the rows of the theater, while Hasan used his keys to secure the main door.



LOCKHEED SR-71 BLACKBIRD

Paul, the elderly janitor, was mopping the floor in central entry hall, where the **Lockheed SR-71 Blackbird** was displayed. He looked wistfully at the huge black jet as he rested his chin on the handle of his mop.

Omar and Hasan were walking down the access ramps toward the central display area. Omar called, “Hi Paul!” but he did not respond.

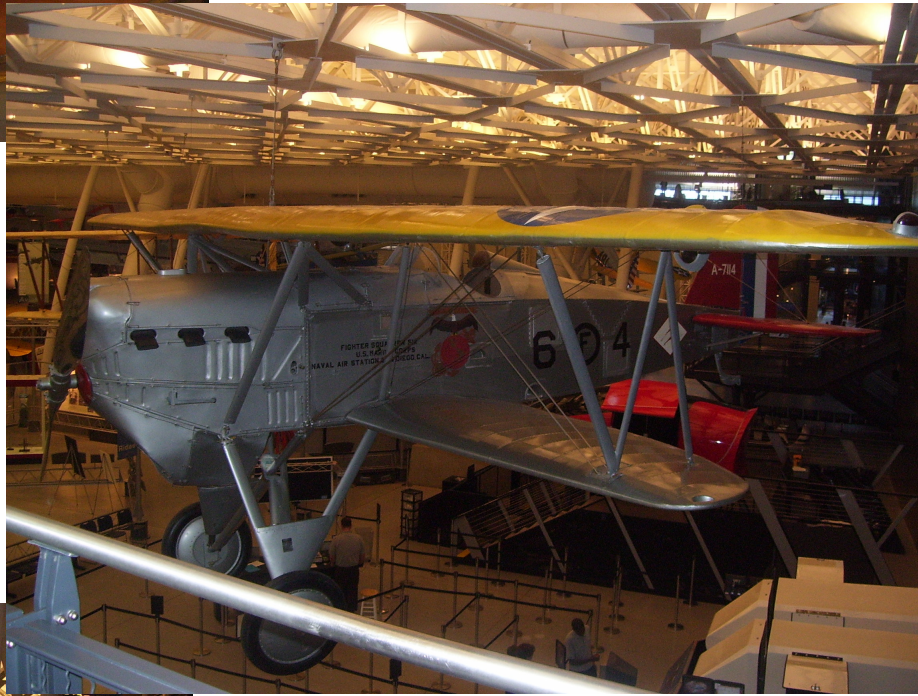
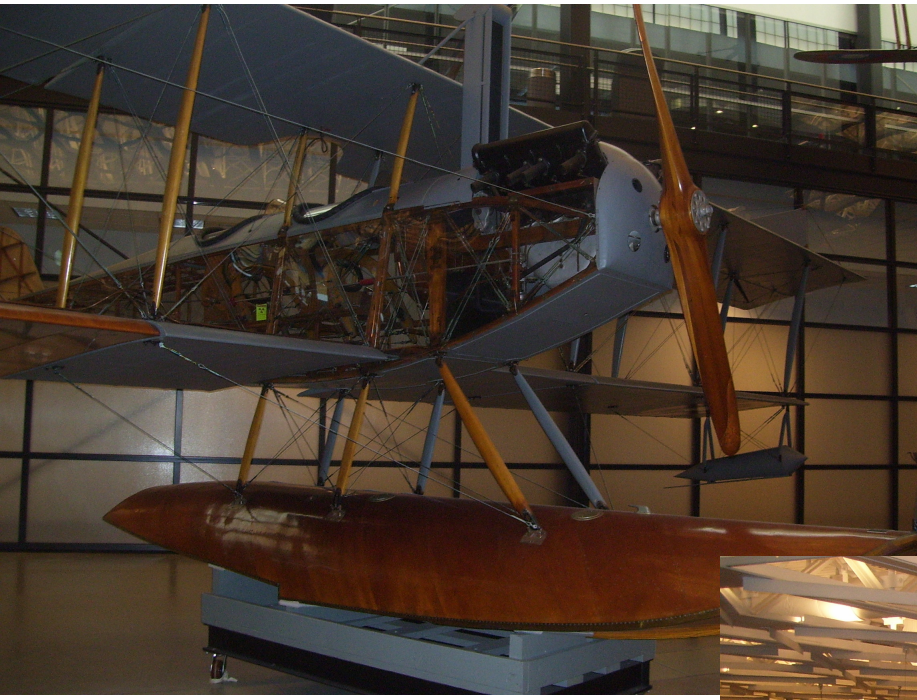
“Daydreaming again,” said Hasan chuckling to himself. Paul loved any machine that could fly including planes, gliders, jets, missiles, the space shuttle...absolutely everything. That is the reason he chose to work at this particular museum.

Omar and Hasan strolled over and started asking if Paul had ever flown a jet like the Blackbird before. They knew he had served in the Air Force for many years when he was a young man.

“I flew fighter planes, but this type of jet hadn’t been invented at that time. Boy, would I have liked to fly this one though!” he said with a big grin.

Paul finished cleaning the floor slowly, and then got his bag and went to the front door to leave. Hasan unlocked the door and let Paul out.

After Paul had left, Omar and Hasan split up to make their rounds. Hasan strolled off in the direction of the **James S. McDonnell Hanger** where all the space flight items, missiles, and satellites were kept, while Omar headed towards the **Boeing Aviation Hanger** (see map) where the WWII planes and helicopters, gliders, and experimental models were kept.



One plane caught Omar's attention as he passed by. It had a wooden propeller, and the wings appeared to be made of tin or aluminum. Omar did not know much about planes, but seeing how interested Paul was in them, he started to take notice of the fine details of each plane as he walked along each isle.

He had never noticed the differences in the planes. He always thought they were all pretty much the same, but as he looked at each one, he realized that they were as individual as people. Each one had something special and beautiful about it.

Omar looked at the next airplane with wings made of metal, but this one had bars shaped like an upside down triangle that supported the wings on each side; the wings were painted yellow.

He could see on closer inspection that the cockpit was very narrow and must have been made to hold only the pilot without any passengers. Omar thought that people back at that time must have been smaller than people today. He had a slim build, but he was pretty sure he would not have been able to fit in that tiny cockpit!

Then another plane suddenly caught his attention. It was larger than the others and its metal exterior shined brightly even in the dim light of the hanger. It looked like polished silver.

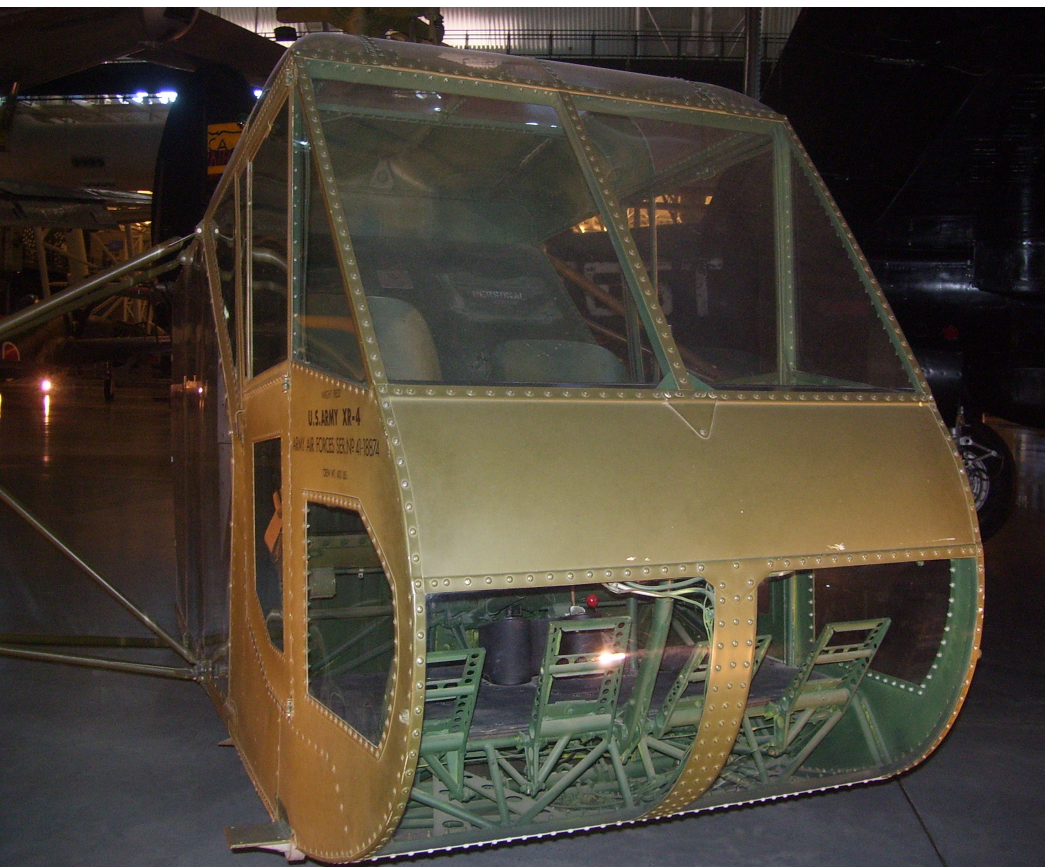


BOEING B-29 SUPERFORTRESS "ENOLA GAY"

Omar gasped as he read the description of this plane's history on the sign in front of it. This was one of the most famous planes in the world. This was the **Enola Gay**. This was one of the planes that dropped atom bombs on Japan during World War II. He read the plaque in front of the plane, which stated that the bombs were dropped on August, 6th and 9th, 1945.

Omar could hardly believe that he was actually standing less than 10 feet away from the plane that was used to drop atom bombs, on the Japanese cities of Hiroshima and Nagasaki. Omar remembered from his high school history lessons that these two bombs combined killed more than 220,000 people!

In all the time that he had worked at the center, he never really thought about the tremendous amount of history that these planes represented. They really documented some of the most important moments in modern history. There was so much he could have learned while working here, but he had never really paid much attention to the aircraft that he had been protecting all these years.



VOUGHT-SIKORSKY XR-4C



KAMAN K-225

Omar moved on to the helicopter display. The squarish, khaki colored **Voght-Sikorsky XR-4C** and the transparent **Kaman K-225** particularly interested him.

The XR-4C was the first mass produced helicopter in the United States and the K-225 was originally used for agriculture to dust crops.

It was amazing to Omar how ingenious the engineers had been in finding ways to adapt these vehicles to different uses. They also must have had very brave pilots who tested these “new” machines. Omar wondered what went through the pilots minds as they first took off in these machines for their maiden voyages.

Some of the helicopters had paddles to push on the floor of the cockpit. Omar figured these must have helped the pilot change direction or speed. He was very curious and wished to learn more about how the machines worked. No wonder Paul spent so much time staring at the planes as he mopped the floors each night, he thought to himself with a smile.



CONCORDE, FOX ALPHA, AIR FRANCE (1976)

Omar was now almost at the end of the hanger. He had seen planes from the early 1900's with canvas wings and wooden bodies, to steel frame helicopters from the 30's, now he was entering the age of modern flight. No plane could represent this period in the history of flight better than the **Concorde**.

"Was there anyone in the world who was not familiar with this plane and its history?" thought Omar.

The plane was so long and large that it had to be placed diagonally in the hanger actually crossing over the isle where visitors walked between the exhibits. Walking under the smooth white belly of the plane, he could see its full length up close.

Omar paused, looked back at all the planes that ran the length of the hanger, and then made a decision that would change his life forever. He did not want to keep watching these planes every night, he wanted to really understand them...and fly them! He was going to become a pilot!

"Amazing!" thought Omar. With a smile on his face, he headed back to the front desk where Hasan must be by now. He could not wait to tell Hasan about his decision...



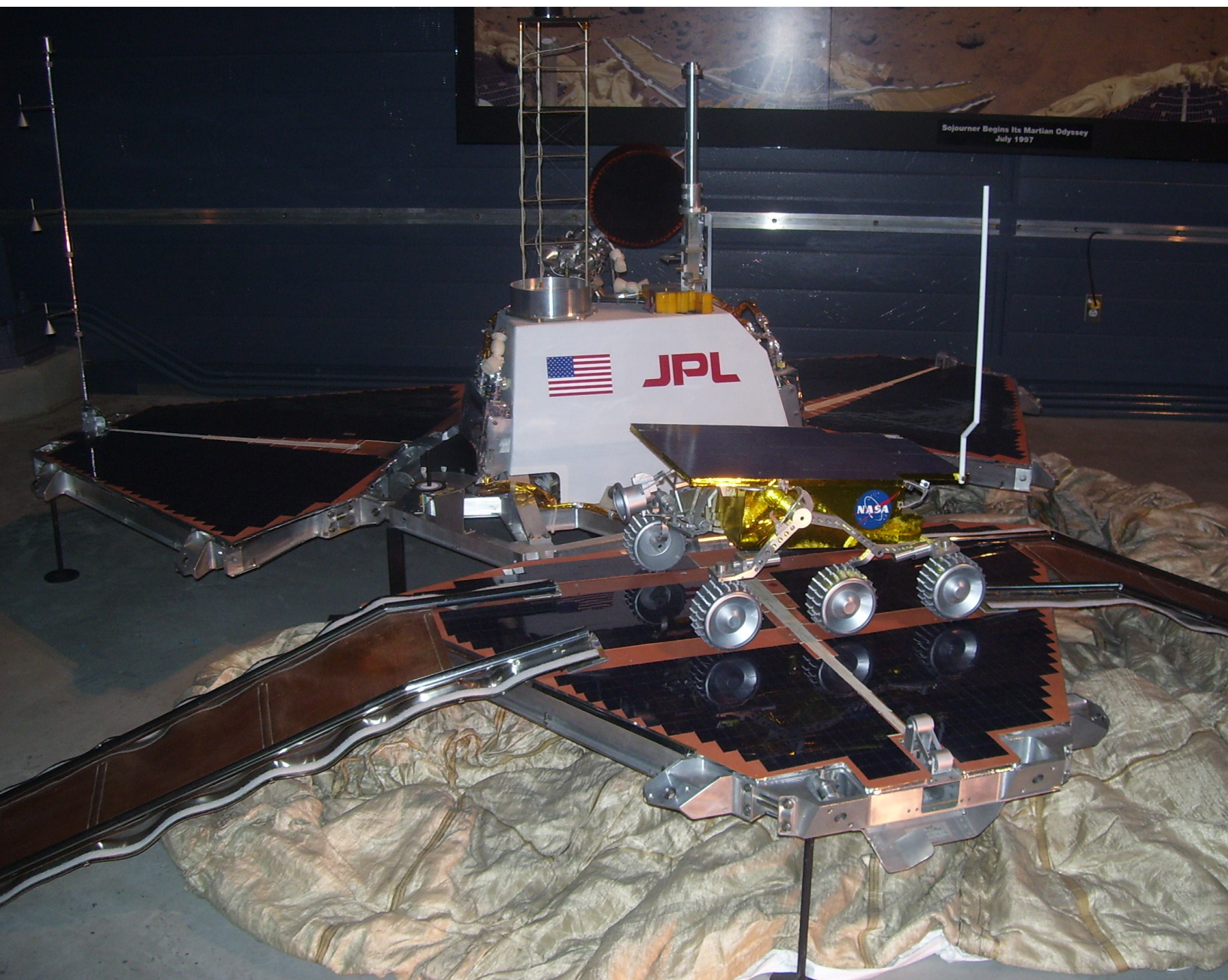
SPACE SHUTTLE, "ENTERPRISE" OV-101

Meanwhile, Hasan stood silently, his hands in his pockets, gazing contentedly at the Space Shuttle Enterprise from the observation balcony that overlooked the entire hanger. He had been standing there for quite a while. He supposed Omar would be back at the front desk by now, but a few more minutes of admiring the Shuttle would not hurt.

When Hasan saw the Space Shuttle, he thought of learning to be an astronaut. He wanted to quit his job being a guard. He looked at the huge nose of the shuttle. He liked the idea of going in to space to go to the moon or go see the planets.

Hasan could not help dreaming about being an astronaut. He really wanted to go to space, but he wondered if it could be possible to go from being a security guard to an astronaut. He decided he would ask Omar his opinion about it, in his heart, he hoped that Omar would support him.

Hassan checked back at the front desk, but Omar was not there yet, so he went back to the hanger to admire all the historical space flight machines and objects that were housed there.



ENGINEERING MODEL, LANDER, MARS, PATHFINDER

Hasan soon came up to a little model. On the sign, it said that this was the **Mars Lander, Engineering Model**. What really caught his attention were the parts that had golden foil on them, they sparkled brightly under the spotlights.

The ramps were extended to the floor, just like they would be on the surface of Mars. The floor under the little machine was so clean you could see the model like a mirror. It must be solar panels used to store energy for the Lander thought Hasan.

Hasan went on looking at the space artifacts until he came to a long line of suits in a glass display case. Hasan had read about the two men who went to the moon, Neil Armstrong and John Glen, they must have worn suits like this.

Hasan thought and thought about going to space. He wanted to be a pilot on the space shuttle. He thought it would be interesting to be a pilot of a shuttle. Hasan could not wait to tell Omar about his dreams.

How long had he been gone from the front desk? Hasan looked at his watch and realized it had been three hours! Omar must be looking for him.



EXTERIOR OF THE SMITHSONIAN NATIONAL AIR AND SPACE MUSEUM
STEVEN F. UDVAR-HAZY CENTER

When he got back to the front desk Omar was sitting there looking at his computer, he did not seem worried at all.

“How come you did not come looking for me?” asked Hasan.

“Hmm?” said Omar looking up from his computer in surprise. “Why would I come looking for you?”

“I have been gone three hours,” replied Hasan. “My rounds should not take more than 1 ½ hours.”

“It has been that long!” asked Omar in surprise. “I have been researching some things on the internet and I did not realize the time had passed.”

“What were you researching?” asked Hasan.

“I have decided to become a pilot, insha-Allah!” said Omar with a smile. “I am tired of just guarding the planes, I want to fly them!”

“You too!” said Hasan happily. “That is exactly what I want to do too! Except I want to be an astronaut and fly the space shuttle.”

“Great!” said Omar, “We can research together and find out what we need to do.

“Sounds like a plan!” said Hasan as he got his laptop open.

By morning, they had all the information they needed. Soon they both would be on their way to fulfilling their dreams. Omar and Hasan had taken an amazing journey through the history of flight, and now they were about to become part of the story themselves...

AIRCRAFT SPECIFICATION INDEX

Lockheed SR-71 Blackbird

No reconnaissance aircraft in history has operated globally in more hostile airspace or with such complete impunity than the SR-71, the world's fastest jet-propelled aircraft. The Blackbird's performance and operational achievements placed it at the pinnacle of aviation technology developments during the Cold War.

This Blackbird accrued about 2,800 hours of flight time during 24 years of active service with the U.S. Air Force. On its last flight, March 6, 1990, Lt. Col. Ed Yielding and Lt. Col. Joseph Vida set a speed record by flying from Los Angeles to Washington, D.C., in 1 hour, 4 minutes, and 20 seconds, averaging 3,418 kilometers (2,124 miles) per hour. At the flight's conclusion, they landed at Washington-Dulles International Airport and turned the airplane over to the Smithsonian.

Manufacturer: Lockheed Aircraft Corporation

Designer: Clarence L. "Kelly" Johnson

Date: 1964

Physical Description:

Twin-engine, two-seat, supersonic strategic reconnaissance aircraft; airframe constructed largely of titanium and its alloys; vertical tail fins are constructed of a composite (laminated plastic-type material) to reduce radar cross-section; Pratt and Whitney J58 (JT11D-20B) turbojet engines feature large inlet shock cones.

Concorde, Fox Alpha, Air France

The first supersonic airliner to enter service, the Concorde flew thousands of passengers across the Atlantic at twice the speed of sound for over 25 years. Designed and built by Aérospatiale of France and the British Aviation Corporation, the graceful Concorde was a stunning technological achievement that could not overcome serious economic problems.

In 1976 Air France and British Airways jointly inaugurated Concorde service to destinations around the globe. Carrying up to 100 passengers in great comfort, the Concorde catered to first class passengers for whom speed was critical. It could cross the Atlantic in fewer than four hours - half the time of a conventional jet airliner. However its high operating costs resulted in very high fares that limited the number of passengers who could afford to fly it. These problems and a shrinking market eventually forced the reduction of service until all Concorde were retired in 2003.

In 1989, Air France signed a letter of agreement to donate a Concorde to the National Air and Space Museum upon the aircraft's retirement. On June 12,

2003, Air France honored that agreement, donating Concorde F-BVFA to the Museum upon the completion of its last flight. This aircraft was the first Air France Concorde to open service to Rio de Janeiro, Washington, D.C., and New York and had flown 17,824 hours.

Manufacturer: Societe Nationale Industrielle Aerospatiale

Manufacturer: British Aircraft Corporation

Physical Description:

Aircraft Serial Number: 205. Including four (4) engines, bearing respectively the serial number: CBE066, CBE062, CBE086 and CBE085.

Also included, aircraft plaque: "AIR FRANCE Lorsque viendra le jour d'exposer Concorde dans un musee, la Smithsonian Institution a dores et deja choisi, pour le Musee de l'Air et de l'Espace de Washington, un appariel portant le couleurs d'Air France."

Boeing B-29 Superfortress "Enola Gay"

Boeing's B-29 Superfortress was the most sophisticated propeller-driven bomber of World War II and the first bomber to house its crew in pressurized compartments. Although designed to fight in the European theater, the B-29 found its niche on the other side of the globe. In the Pacific, B-29s delivered a variety of aerial weapons: conventional bombs, incendiary bombs, mines, and two nuclear weapons.

On August 6, 1945, this Martin-built B-29-45-MO dropped the first atomic weapon used in combat on Hiroshima, Japan. Three days later, Bockscar (on display at the U.S. Air Force Museum near Dayton, Ohio) dropped a second atomic bomb on Nagasaki, Japan. Enola Gay flew as the advance weather reconnaissance aircraft that day. A third B-29, The Great Artiste, flew as an observation aircraft on both missions.

Manufacturer: Martin Co., Omaha, Nebr.

Manufacturer: Boeing Aircraft Co.

Date: 1945

Country of Origin: United States of America

Materials:

Polished overall aluminum finish

Physical Description:

Four-engine heavy bomber with semi-monocoque fuselage and high-aspect ratio wings. Polished aluminum finish overall, standard late-World War II Army Air Forces insignia on wings and aft fuselage and serial number on vertical fin; 509th Composite Group markings painted in black; "Enola Gay" in black, block letters on lower left nose.

Engineering Model, Lander, Mars, Pathfinder

Mars Pathfinder was the first spacecraft to land on the surface of the red planet since the Viking mission in 1976. The artifact is a full-scale engineering prototype for a spacecraft that was launched on December 4, 1996. On reaching Mars on July 4, 1997, the spacecraft entered the planet's thin atmosphere, was slowed by a parachute and then rockets, and then landed by bouncing on inflated airbags. The protective aeroshell then unfolded to provide the three flat platforms, one of which held a rover (Sojourner).

Pathfinder had a TV camera and scientific instruments to gather scientific data on the martian atmosphere and weather, as well as solar cells to provide power and communications. The lander operated for over 90 days, during which it relayed 2.3 gigabits of data including that gathered by Sojourner. Some of this data suggest the presence of large amounts of water on Mars in the distant past. The spacecraft as well as the prototype were designed and built by JPL for NASA's office of Space Science.

Manufacturer: Jet Propulsion Laboratory, California Institute of Technology

Country of Origin: United States of America

Materials:

Mixed metals, electronics, optics

Kaman K-225

This Kaman K-225 was the first helicopter to fly with a gas turbine driven transmission. Turbines offered important advantages for helicopters including reduced weight, improved reliability, easier maintenance and higher power-to-weight ratios, which allowed for larger useful loads, increased safety and lower operating costs. In 1949, Kaman built the K-225 commercial model, primarily for use as a crop-duster. The Navy ordered two to evaluate the advantages of the intermeshing rotor system and the novel blade mounted servo-flap control system.

In 1951, Kaman replaced the reciprocating engine that originally powered this K-225 with a Boeing 502-2 gas turbine to demonstrate the potential of jet-powered helicopters to the Navy. The K-225 served as the prototype for Kaman's successful HOK series of military helicopters, which incorporated a cabin in place of the open cockpit. The engine currently on the aircraft is not original.

Manufacturer: Kaman Helicopter Company

Date: 1949, 1951

Country of Origin: United States of America

Physical Description:

2-seat tandem experimental helicopter with intermeshing twin rotor, steel-tube fuselage, turbine engine, tricycle landing gear.

Space Shuttle, "Enterprise" OV-101

The first Space Shuttle orbiter, "Enterprise," is a full-scale test vehicle used for flights in the atmosphere and tests on the ground; it is not equipped for spaceflight. Although the airframe and flight control elements are like those of the Shuttles flown in space, this vehicle has no propulsion system and only simulated thermal tiles because these features were not needed for atmospheric and ground tests. "Enterprise" was rolled out at Rockwell International's assembly facility in Palmdale, California, in 1976. In 1977, it entered service for a nine-month-long approach-and-landing test flight program. Thereafter it was used for vibration tests and fit checks at NASA centers, and it also appeared in the 1983 Paris Air Show and the 1984 World's Fair in New Orleans. In 1985, NASA transferred "Enterprise" to the Smithsonian Institution's National Air and Space Museum.

Vought-Sikorsky XR-4C

It was not the first helicopter to see military service, but the XR-4 was the world's first mass-production helicopter and the first successful production rotorcraft of single-rotor configuration. The success of this aircraft paved the way for the large-scale introduction of more advanced rotorcraft into military and civilian service. The XR-4 represents the culmination of Igor I. Sikorsky's attempts to create a practical helicopter. This work began in 1909 but did not reach fruition until 30 years later. The XR-4 also helped ushered in training practices and procedures that became standard in all future rotary winged operations in America.

Manufacturer: Sikorsky Aircraft Company

Date: 1942

Country of Origin: United States of America

Notes

